

CLAIMS

What is claimed is:

1. An apparatus for synchronizing presentation of renderable content of at least two

2 digital bit streams that reside in respective storage media, said apparatus comprising:

3 a stream characteristic unit for deriving information characteristic of content of one of

4 said streams;

5 means for receiving a signal that carries information characteristic of content of the

6 other stream;

7 means for comparing said information of said one stream to said information of the

8 other stream;

9 a player for progressing forward in said one stream to play back content of said one

10 stream; and

11 means for synchronizing said presentation by modifying said progress based on said

12 comparison by said comparing means.

1 2. The apparatus of claim 1, wherein said streams include image data and said

2 presentation is at least partially visual.

1 3. The apparatus of claim 1, wherein said streams include audio data and said

2 presentation is at least partially aural.

1 4. The apparatus of claim 1, wherein said presentation spans a first time and a

2 second time, and said content of said one stream and said content of said other stream pertain

3. at said first time to respective first portions of said streams and at said second time to
4. respective second portions of said streams.

1. 5. The apparatus of claim 1, wherein said signal includes control information for
2. controlling processing of said other stream to effect said synchronizing.

1. 6. The apparatus of claim 1, further comprising input means configured for
2. causing a function control command to issue by interactive operation of said input means by a
3. user responding to a rendering of said other stream, said command causing said information
4. characteristic of content of said other stream to be generated.

1. 7. The apparatus of claim 1, wherein said player plays back said content as
2. viewable images derived from said one stream, said playing back producing said viewable
3. images on a display in synchronization with playback on another display of viewable images
4. derived from said other stream.

1. 8. The apparatus of claim 1, wherein said one stream includes image data and has
2. a partially decompressed form before decompression via an image transform that operates on
3. frequency components of image data, said deriving being performed based on said stream in
4. said partially decompressed form without further decompression.

1. 9. The apparatus of claim 1, wherein said deriving occurs prior to said storing of
2. said one stream and wherein said stored stream has embedded tags referencing corresponding
3. portions of said characteristic information.

1 10. The apparatus of claim 1, wherein said apparatus comprises a personal video
2 recorder.

1 11. The apparatus of claim 1, further comprising:
2 a second stream characteristics unit for deriving said information characteristic of
3 content of the other stream;
4 means for forming said signal from said information derived by the second stream
5 characteristics unit; and
6 means for outputting said signal.

1 12. The apparatus of claim 11, further comprising:
2 a third stream characteristics unit for deriving information characteristic of content of a
3 third digital bit stream that has renderable content and resides in a third storage medium;
4 means for receiving a signal that carries information characteristic of content of said
5 other stream;
6 means for comparing said information of the third stream to said information of the
7 other stream;
8 a player for progressing forward in said third stream to play back content of said third
9 stream; and
10 means for synchronizing said presentation by modifying said progress in said third
11 stream based on said comparison by said means for comparing said information of the third
12 stream.

1 13. The apparatus of claim 1, wherein said characteristic information is a
2 watermark.

1 14. The apparatus of claim 1, wherein said characteristic information is a textual
2 tag.

1 15. The apparatus of claim 1, wherein said characteristic information is a digital
2 signature.

1 16. The apparatus of claim 1, wherein said modifying comprises modifying a
2 direction of said progress.

1 17. The apparatus of claim 1, wherein said modifying comprises modifying a
2 magnitude of said progress.

1 18. The apparatus of claim 1, wherein an output of said comparison by said
2 comparing means is a count of intraframe coded frames.

1 19. The apparatus of claim 1, further comprising a player for progressing forward
2 in said other stream to play back content of said other stream;

3 wherein said means for synchronizing said presentation modifies said progress in said
4 other stream based on said comparison by said comparing means.

1 20. The apparatus of claim 1, wherein said modifying fast forwards said playback.

2. 21. The apparatus of claim 20, further comprising a video timer that keeps a time
3 count in correspondence with said playback, wherein said fast forwarding is to a point in said
4 playback that corresponds with a predetermined value of said time count.

1 22. The apparatus of claim 1, wherein said modifying rewinds said playback.

1 23. The apparatus of claim 1, wherein said modifying halts said playback.

2 24. The apparatus of claim 1, wherein said modifying includes a combination of
3 modifications selected from the group consisting of: fast forwarding, rewinding, slowing down
4 and halting said playback.

1 25. A method for synchronizing presentation of renderable content of at least two
2 digital bit streams that reside in respective storage media comprising the steps of:

3 deriving information characteristic of content of one of said streams;
4 comparing said information to information characteristic of content of the other stream;
5 progressing forward in said one stream to play back content of said one stream; and
6 synchronizing said presentation by modifying said progress based on said comparison
7 by said comparing means.

1 26. The method of claim 25, further comprising before said deriving step the step of
2 including in said streams image data so that said presentation is at least partially visual.

1 27. The method of claim 25, further comprising before said deriving step the step of
2 including in said streams audio data so that said presentation is at least partially aural.

1 28. The method of claim 25, wherein said presentation spans a first time and a
2 second time, and said content of said one stream and said content of said other stream pertain
3 at said first time to respective first portions of said streams and at said second time to
4 respective second portions of said streams.

1 29. The method of claim 25, further comprising the step of including in said signal
2 control information for controlling processing of said one stream to effect said synchronizing.

1 30. The method of claim 25, further comprising the step of providing input means
2 configured for causing a function control command to issue by interactive operation of said
3 input means by a user responding to a rendering of said other stream, said command causing
4 said information characteristic of content of said other stream to be generated.

1 31. The method of claim 25, wherein said content is played back in said progressing
2 step as viewable images derived from said one stream, said playing back producing said
3 viewable images in synchronization with playback of viewable images derived from said other
4 stream.

1 32. The method of claim 25, wherein said one stream includes image data and has a
2 partially decompressed form before decompression via an image transform that operates on
3 frequency components of image data, said method further including before said deriving step
4 the step of partially decompressing said one stream to said partially decompressed form, and

5 wherein said deriving step is performed based on said stream in said partially decompressed
6 form without further decompression.

1 33. A method for synchronizing presentation of renderable content of two or more
2 digital bit streams that reside in respective storage media, said content being played back by
3 progressing forward in said two or more streams, comprising the steps of:

4 receiving one of said digital bit streams;

5 deriving information characteristic of content of said received stream;

6 outputting a signal carrying the derived information;

7 receiving said signal;

8 comparing characteristic information in said received signal to respective information
9 characteristic of content of one or more of said digital bit streams other than said received
10 stream; and

11 synchronizing said presentation by modifying said progress of said respective playbacks

12 based on said one or more comparisons.

1 34. A computer program for synchronizing presentation of renderable content of at
2 least two digital bit streams that reside in respective storage media, said program comprising:

3 instruction means deriving information characteristic of content of one of said streams;

4 instruction means for comparing said information to information characteristic of
5 content of the other stream;

6 instruction means for progressing forward in said one stream to play back content of
7 said one stream; and

8 instruction means for synchronizing said presentation by modifying said progress based
9 on said comparison by said instruction means for comparing.

1 35. An apparatus for synchronizing presentation of renderable content of at least two
2 digital bit streams that reside in respective storage media, said apparatus comprising:

3 a stream characteristic unit for deriving information characteristic of content of one of
4 said streams;

5 means for receiving a signal that carries information characteristic of content of the
6 other stream;

7 means for comparing said information of said one stream to said information of the
8 other stream;

9 means for progressing forward in said one stream to play back content of said one
10 stream; and

11 means for synchronizing said presentation by modifying said progress based on said
12 comparison by said comparing means.